

## **DETERMINANTS OF HEALTH EXPENDITURE IN POLAND**

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### **Abstract**

One of the basic needs of the households is a health care. The complexity of the factors determining the health status of a population tends to believe that real expenditures on health care are characterized by a great diversity, as well as a sense of health is socially diverse phenomenon. The aim of the study is to investigate the level of expenditure on health incurred in Polish households in 2004-2013 and to identify the factors affecting such expenditures. The source of information used in the study was the household budget survey of the Central Statistical Office of Poland. The main method used in this study was regression analysis. Health expenditure increases every year together with their share in total household expenditure. The increase in drug consumption, rising supply of private health services, as well as the aging of the population, seem to decide on the increase in households health expenditure. The most important factors affecting the health spending in Polish households are: age of members of the household, income per capita and the level of education of the head of the family. Rational health policy requires a current state of knowledge regarding determinants of the health needs of the households.

**Key words:** household expenditure on health, factors spending, regression analysis

**JEL Code:** D12, I13

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### **Introduction**

One of the basic needs of the households is a health care. The complexity of the factors determining the health status of a population tends to believe that real expenditures on health care are characterized by a great diversity, as well as a sense of health is socially diverse phenomenon. The aim of the study is to investigate the level of expenditure on

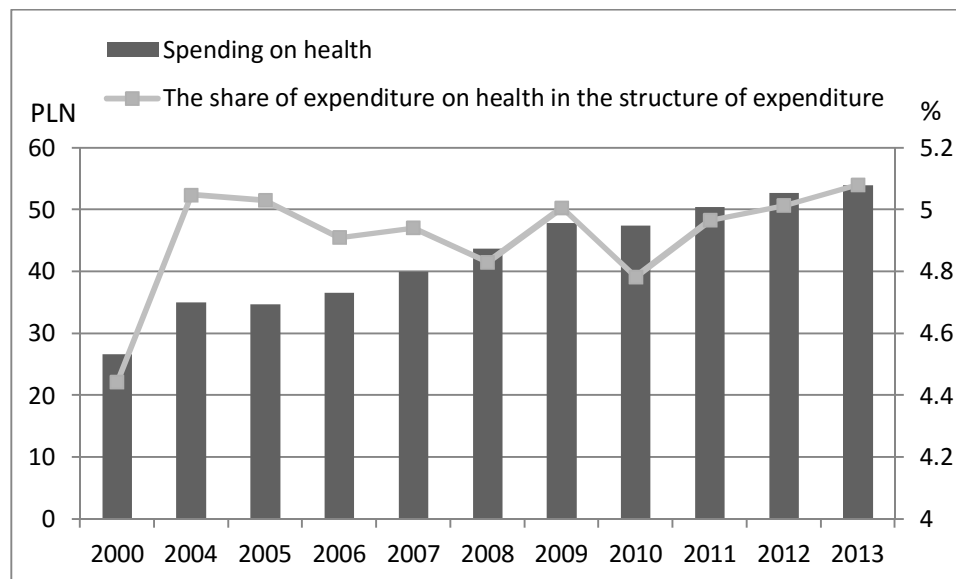
health incurred in Polish households in 2004-2013 and to identify the factors affecting such expenditures.

This article attempts to characterize the level of expenditure on health in Polish households and to identify their determinants. Information presented in this article represents only a narrow slice of very broad issues connected with health care financing. In order to conduct appropriate studies, it was necessary to use unpublished data on household budgets obtained from Central Statistical Office in Poland.

## 1 Health expenditure in budgets of Polish households

Data from the Household Budget Survey for the period 2000-2013 indicate that the average monthly expenditure on health per capita has more than doubled, from almost 27 PLN in 2000 to almost 54 PLN in 2013. The share of health spending in the total expenditure of households amounted to 4.4% in 2000 and 5.1% in 2013. During the economic crisis in the years 2008- 2010 the proportion of expenditure on health in the structure of household budgets has declined (Piekut, Kludacz, 2014), but then they started increasing (Fig. 1).

**Fig. 1: Health expenditure per capita in PLN and their share in total expenditure of Polish households in the years 2000-2013.**



Source: own work based on data from Central Statistical Office

The increase in health expenditure can be connected with the generally recognized causes, such as: aging population, an increase in household income, an increase in the prices of medicines, new medical technologies etc. (Golinowska, 2003; Liu, Cline, Schondelmeyer, Schommer, 2008).

Health expenditure depends on many determinants (Piekut, 2008). One of them is the age of family members. Health expenditure in household with a head aged 70 and older were more than twice higher than for all households (Tab. 1). The average monthly expenditure on health in households whose head is under 30 years old was about 37 PLN per person, while in the households whose head is aged between 60 and 70 years - about 81 PLN per person, and over 70 years old - 122 PLN per person. The value of the correlation coefficient<sup>1</sup> between health expenditure and age of the household head was 0.270.

The survey (Zalega, 2013) also shows that the households of the elderly, often reduce health expenditure for financial reasons. In the study of Social Diagnosis (Czapiński, Panek, 2011), the pensioners were one of the groups forced to resign from many health services due to financial reasons. The infirmities of old age and the difficult financial situation were the most noticeable problems of these households regarding the health.

It was also observed that Polish households often incur financial liabilities for purposes related to health care. Recent studies (Dąbrowska, Janoś-Kresło, Słaby, Witek, 2013) have shown that it concerned mainly the pensioners. Pensioners and lonely older people were the groups with the highest percentage (1/3 respondents) of income saved for the needs related to health care.

**Tab. 1: The level of health expenditure in Polish households due to the age of the household head in 2012.**

The age of the household head	Health expenditure per capita
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<sup>1</sup>Correlation coefficients measure the strength of association between two variables. The value of a correlation coefficient ranges between -1 and 1. The greater the absolute value of a correlation coefficient, the stronger the *linear* relationship. The strongest linear relationship is indicated by a correlation coefficient of -1 or 1. If there is no linear correlation or a weak linear correlation, this coefficient is close to 0.

for all households	53,33
Less than 30 years old	36,86
30 - 39	40,65
40 - 49	36,20
50 - 59	47,61
60 - 70	81,02
More than 70 years old	121,55
Correlation coefficient	0,270

Source: own work based on data from Central Statistical Office

The level of income per one household member is a key factor in determining consumption. Household income also determines the standard of living, ability to satisfy the consumption needs, and consequently the quality of life (Rad, Vahedi, Teimourizad, Esmaeilzadeh, Hadian, Pour, 2013; Rout, 2010; Siwuel, Song Hyun, 2010).

Health expenditure were increasing together with increasing level of household wealth (Tab. 2). Average monthly health expenditure in households from the first income group were around 26 PLN per capita, and from the third income group - 96 PLN per capita. Coefficient relationship between the level of disposable income and health expenditure in the households was 0,297.

It is pointed out (Hipsz, 2012) that less affluent people were more often forced to give up the expenditure related to health care compared to better-off people. The report *Social Diagnosis* (Czapiński, Panek, 2011) indicated that the financial reasons were the main factor forcing people to abandon a dental treatment (more than 17% of households), and purchase of drugs (about 18% of households).

**Tab. 2: The level of health expenditure in Polish households due to the income group in 2011<sup>2</sup>.**

Income group	Health expenditure
I	25,69
II	53,47
III	96,42
Correlation coefficient	0,297

Source : own work based on data from Central Statistical Office

<sup>2</sup> Households were divided into three equal groups: 33.3% of households with the lowest income created the first income group, and 33.3% of households with highest income created the third income group.

Health expenditure were also different depending on the education of household head. The largest monthly health expenditure were observed in households with a higher education - about 81 PLN per person. The health expenditure were smaller in households with head having secondary or post-secondary education - approximately 56 PLN per person (Tab. 4) . The smallest expenditure were noted in households where the head had basic vocational education - less than 37 PLN per person. The correlation relationship between health expenditure and education level of the household head was 0.164.

Higher level of education correlates with higher income, which enable out-of-pocket payments for health services. The other studies (Golinowska, 2003) emphasize that higher education promotes better health and proper health behaviors. The study of Social Diagnosis (Czapiński, Panek, 2011) also demonstrated that "education" is a significant variable differentiating health expenditure. It was pointed out that the least differences were related to the expenditure on hospital treatment, because they are reimbursed by the health insurance system, and not out of pocket. The most differences were related to the expenditure on drugs, because poorer patients did not often have the money to buy them.

**Tab. 3: Level of spending on products and medical services in Polish households due to the education of household head in 2011.**

Education of household head	Health expenditure
Lower secondary, primary or less	50,93
Basic vocational	36,60
Secondary and post-secondary	55,63
Higher	80,67
Correlation coefficient	0,164

Source: own work based on data from Central Statistical Office

## 2 Characteristics of households and health expenditure

In order to estimate the impact of variables describing characteristics of the households on their health expenditure, we performed regression analysis. The dependent variable were monthly expenditure on health per person in the household. On the other hand the set of independent variables was represented by various qualitative variables, such as: education of household head (no education, primary, basic vocational, secondary or post-secondary education), the location of household (village, town with less than 20 thousand inhabitants, the town with a population between 20 000 and 99 000, the town with a

population between 200 000 and 499 000, the town with a population exceeding 500 000), region where the household resides, biological type of household (married couples without children, married couples with 1 child, married couples with 2 children, married couples with 3 and more children, single-person households), the family life cycle (young marriages (couples) without children; married couples with children of preschool age; married couples with children of school age; older marriages (couples) without children- professionally active; older marriages (couples) without children- professionally inactive). The independent variables were also represented by quantitative variables, such as: monthly disposable income per person in the household, age of household head, the number of people in the household, the number of disabled people in the household, living area of a house / apartment.

Qualitative variables were transformed into dummy variables. When we estimated the models with systems of dummy variables, it was necessary to remove one of the dummy variable in each system, in order to avoid the collinearity.

The model created for health expenditure in Polish households turn out to be significant ( $F_{44.37} = 166.33$ ). All independent variables entered into the model explained 16% of the variance in the dependent variable ( $R^2 = 0.16$ ). The standard error of estimation was 107.13.

Higher health expenditure may be related to:

- the age of the household head (an increase in age of the household head by one year is associated with an increase of health expenditure by 1.39 PLN),
- higher disposable income per capita (an increase in disposable income by 1 PLN will result in an increase in health expenditure by 0.02 PLN),
- the households of pensioners (the health expenditure in such households are higher by nearly 16 PLN),
- higher education of the household head (in households with higher educated head the health expenditure are higher by 17.62 PLN) (Tab. 4).

Lower health expenditure can be expected in households representing such biological types of family as: married couples with 1 child or two children and other types of households.

**Tab. 4. The results of regression analysis to estimate the impact of independent variables on health expenditure in Polish households in 2012. (it contains 15 independent variables with the greatest BETA indicator )**

Specification	BETA	Standard error – with BETA	The regression coefficient - b	Standard error – with b	t(37382)	p
Free term variable			-22,67	5,705	-3,97	0,0001
Age of the reference person	0,1936	0,0098	1,39	0,070	19,81	0,0000
Disposable income per capita	0,1661	0,0055	0,02	0,001	30,05	0,0000
Married couples with 1 child	-0,0698	0,0106	-26,25	3,998	-6,57	0,0000
Married couples with at least one child and other relatives	-0,0679	0,0121	-27,54	4,917	-5,60	0,0000
Married couples with two children	-0,0678	0,0121	-25,49	4,569	-5,58	0,0000
Pensioners	0,0614	0,0136	15,95	3,544	4,50	0,0000
Education of household head: higher	0,0606	0,0060	17,62	1,742	10,12	0,0000
Married couples and singles without children	-0,0599	0,0074	-16,59	2,052	-8,08	0,0000
Number of disabled people	0,0554	0,0052	12,38	1,172	10,56	0,0000
Household location: Mazowieckie Voivodeship	0,0533	0,0058	17,60	1,910	9,22	0,0000
Education of household head: primary	-0,0531	0,0058	-16,73	1,840	-9,09	0,0000
Education of household head: basic vocational	-0,0449	0,0059	-11,32	1,489	-7,60	0,0000

The elderly people: professionally inactive	0,0437	0,0140	12,47	3,993	3,12	0,0018
A single mother with children and other relatives	-0,0407	0,0066	-31,00	5,045	-6,15	0,0000
Household location: town with a population exceeding 500 000	0,0396	0,0056	13,91	1,980	7,03	0,0000

Source: own work based on data from Central Statistical Office

This, as well as other studies (Masseria, Mladovsky, Hernández-Quevedo, 2010; Piekut, 2008) show that the age of family members and disposable income are important determinants of health expenditure. Flores and others point (Flores, Krishnakumar, O'Donnell, van Doorslaer, 2008) that low incomes, particularly in households located in villages are often insufficient to cover the cost of treatment. In such a situation, the consumers reduce the consumption of food and reduce spending on education and other products. (Wang, Zhang, Hsiao, 2006).

## Conclusion

The carried analysis of health spending in Polish households lead to some interesting findings and conclusions.

Health expenditure has been rising every year. It has been also noticed an increasing share of such expenditure in total household expenditure. Current trends in consumer behavior and demographic changes will result in a further increase in health expenditure in household budgets

The biggest relationship between health expenditure and household characteristics was demonstrated in relation to the age of household head, and then to the disposable income per capita and education level of household head. The higher the age and the education level of the household head and the greater disposable income per capita, the higher health expenditure.

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